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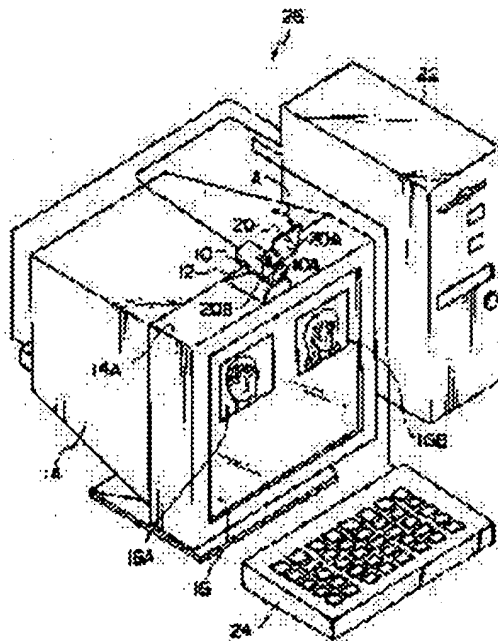
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(54) IMAGE PICKUP DEVICE AND IMAGE DISPLAY DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain an image pickup device and an image display device for facilitating adjustment of a viewing angle at picking up the image of an operator himself as an object, in the case of holding a TV conference by using a personal computer.

SOLUTION: A PC camera 10 is installed on the top 14A of a display 14 for picking up an image 16A to be displayed on the screen 16 of the display 14, and a plane mirror 20 for reflecting nearly the same object image as the image 16A of the object to be picked up is installed over the lens 10A. Thus, by changing the direction of the PC camera 10 so that the operator's face as the object may be reflected in the center of the plane mirror 20, the operator's face is positioned in the center of the image 16A to be picked up. Thus, it is unnecessitated to operate the PC camera 10 while viewing the image 16A, then, the adjustment of the viewing angle for the PC camera 10 is facilitated.



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CLAIMS

[Claim(s)]

[Claim 1] The image pick-up device characterized by forming the mirror which copies the image of a photographic subject and the photographic subject image of abbreviation identitas which are picturized by said image pick-up device by the image pick-up device in the image pick-up device which picturizes the image which prepares for an image display device and is displayed on the screen of said image display device.

[Claim 2] Said mirror is an image pick-up device according to claim 1 characterized by only for the angle formed with the look which looked at the center of a mirror, and said optical axis, and the abbreviation same include angle having inclined in the direction of a photographic subject, and having arranged them from the eye located on the abbreviation optical axis of human being from whom a mirror plane serves as said photographic subject to the field which intersects perpendicularly with the optical axis of the lens of said image pick-up device.

[Claim 3] The image pick-up device according to claim 1 or 2 characterized by having the drive control means which turns the mirror plane of said mirror to a photographic subject using the distance information on a distance measurement means to measure distance with said photographic subject, and the photographic subject measured with said distance measurement means.

[Claim 4] Said mirror is an image pick-up device given in any 1 term of claim 1 characterized by being a convex mirror - claim 3.

[Claim 5] The image display device characterized by having arranged said image pick-up device in said screen in the image display device equipped with the image pick-up device which picturizes the image displayed on a screen.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the image pick-up device with which the personal computer which holds TV meeting etc. was equipped and which picturizes the image transmitted to a communications partner, and the image display device which displays the image.

[0002]

[Description of the Prior Art] Generally to the various networks formed with cable circuits, such as the telephone line, LAN or a communication satellite, etc., a personal computer In TV conference system which it is made to connect possible [a communication link / (call / only / hereafter / a "personal computer)"], and those which are in the distant location do [voice / a mutual image and voice] data communication, and holds conversation and a meeting The method of forming PC camera (image pick-up device) for picturizing one's image in the upper part of a display (image display device) is learned. [who transmits to a communications partner]

[0003] Moreover, as other methods of attaching PC camera in a personal computer, the approach (JP,9-128091,A) of attaching in the display upper limit of a book type personal computer, the method (JP,8-130702,A) of transmitting the image data which inserted in the PC Card slot of a personal computer the body part of PC camera used as the PC card mold, attached it, and picturized it to a personal computer side, etc. are proposed.

[0004] PC camera attached in the display upper part of the personal computer used for the above TV conference systems is shown in drawing 9 and drawing 10.

[0005] The PC camera 100 is located in screen 108 outside of a display 106, and is installed in the upper part of a display 106. This PC camera 100 is supported rotatable in the direction of four directions by predetermined within the limits at the stand 102 top, and is structure fixable towards the direction of arbitration. Here, the PC camera 100 is turned to the person 114 located ahead of a display 106.

[0006] In addition, rotation actuation of the PC camera 100 has the method moved by hand, the method which operates the rotation device (illustration abbreviation) prepared in the PC camera 100 with remote control.

[0007] Moreover, it connects with the body 104 of a personal computer to which the display 106 was connected, and the PC camera 100 is the configuration which can display the picturized image on Screen 108 of a display 106 through the body 104 of a personal computer. It connects also with the still more above communication lines (network), and this body 104 of a personal computer is in the condition in which data communication is possible.

[0008] By such system, the person 114 located ahead of a display 106 with the PC camera 100 is picturized, and the image 110 is displayed on Screen 108 of a display 106. Therefore, a person 114 can check his own image pick-up condition by seeing this image 110.

[0009] Here, if it is in the condition that the circuit was connected with the communications partner using the same system, since a partner's image 112 which is picturized similarly and transmitted via a circuit will be displayed on Screen 108, it becomes possible also for the figure of a communications

partner to check a person 114 to coincidence. Moreover, such both (itself and partner) image is copied out also like the display by the side of a communications partner.

[0010] Furthermore, audio transmission is also possible with an image by using the microphone connected to the personal computer (or built-in), and a loudspeaker (all being illustration abbreviations). With TV conference system using such a personal computer, both who communicate can hold conversation and a meeting to both sides through a partner's image and voice which are mostly transmitted to real time.

[0011]

[Problem(s) to be Solved by the Invention] However, since PC camera separated with the image display location in a screen and was arranged with PC camera of the above-mentioned configuration, field angle doubling for picturizing one in the suitable location in an image was not easy. [who becomes a photographic subject]

[0012] That is, since a big aperture (angular difference) is between the looks I2 when seeing a look I1 and the PC camera 100 in case a person 114 looks at an image 110 like drawing 10, vertical movement of the eye when seeing them by turns or a face is also naturally greatly forced ** and troublesome actuation.

[0013] Furthermore, when viewing by oneself the image 110 with which he was picturized, though natural, right and left look opposite. That is, if the PC camera 100 is rotated rightward temporarily, a photographic subject (person 114) image will move leftward [opposite] within an image 110. Therefore, it will move in the direction contrary to the direction to which a photographic subject image wants to move the PC camera 100 in the case of field angle doubling of a longitudinal direction, and it had the field where the actuation direction is unclear.

[0014] On the other hand, since it is carried out at the time of TV meeting, looking at a partner's image usually displayed on a screen, both become the image the face by the image pick-up from the slanting upper part turned [image] to the bottom for a while. The conversation which addresses toward the partner of such an image is very unnatural compared with an ordinary conversation which looks at and discusses a partner's face.

[0015] Here, although their eye and face can also be turned to the PC camera 100 since natural (the transverse plane was turned to) themselves is shown to a partner, Screen 108 cannot be seen at this time. Therefore, it becomes impossible to check the expression shown to its location and partner of a face within an image 110.

[0016] when talking by field angle doubling when picturizing one in case TV meeting etc. is held with a personal computer in consideration of the above-mentioned fact being easy for this invention -- a condition with the natural image of a photographic subject -- it can picturize -- and the image pick-up condition at that time -- a photographic subject -- let it be a technical problem to offer the image pick-up device and image display device which can be checked also to him. [who becomes a photographic subject]

[0017]

[Means for Solving the Problem] In order that an image pick-up device according to claim 1 may picturize the image displayed on the screen of an image display device, it prepares for the image display device, and the mirror which copies the image of a photographic subject and the photographic subject image of abbreviation identitas to picturize is formed.

[0018] Its face comes to be located in the center of the image picturized by changing the sense of an image pick-up device so that its face may be reflected in the center of a mirror by this. [who becomes a photographic subject] Moreover, since what is necessary is to see only a mirror and just to operate an image pick-up device, if it is not necessary to see the image of a screen and puts in another way at this time, the useless actuation by migration of a look also decreases.

[0019] A mirror is the most common as an instrument for catching one's sight etc., and the usage is known further again so that naturally. For example, when seeing one's face using a hand mirror, if it is usual, a hand mirror can be satisfactorily turned in the part and direction which want to see a face. Since a motion of the image which carries out right-and-left reversal and is reflected suits and is visible to a

motion of a mirror when moving a mirror to a longitudinal direction or leaning it to especially this, it may not be thinking of [how a mirror should be moved to the image of an image to see] in detail.

[0020] Since especially actuation of the image pick-up device for similarly doubling one's face in the center of a mirror established in the image pick-up device can be performed for how to a longitudinal direction to move to consider like the above, and pass, it will become intelligible. Therefore, field angle doubling of an image pick-up device becomes easy by these things.

[0021] Furthermore, if its face is turned to an image pick-up device, since its face will be reflected to the mirror formed in the image pick-up device to show a partner one's expression (image which turned to the transverse plane), its own image which a partner looks at can be checked only by migration of few looks of seeing the face copied by the mirror. [natural]

[0022] To the field where the optical axis of the lens of an image pick-up device and a mirror plane cross at right angles, an image pick-up device according to claim 2 inclines in the direction of a photographic subject, and is arranged. The eyes of human being who becomes a photographic subject are mostly located on the optical axis, and whenever [tilt-angle] is set as the angle and abbreviation identitas which are formed with the look and optical axis when seeing the center of a mirror from there.

[0023] An eye is located at the core of the image picturized by the image pick-up device, and a mirror by this, location gap of the photographic subject image in the image to the photographic subject image of the mirror seen from a photographic subject decreases, and field angle doubling performed by seeing a mirror becomes accuracy more.

[0024] The image pick-up device according to claim 3 has the drive control means which turns the mirror plane of a mirror in the direction of a photographic subject using the distance information on a distance measurement means to measure distance with a photographic subject, and the photographic subject measured with the distance measurement means.

[0025] When this moves forward and backward somewhat with the condition that the field angle of an image pick-up device does not shift from near the center of the image with which a photographic subject changes a posture and is picturized after doubling with a photographic subject (on the optical axis of a lens), the distance of an image pick-up device and a photographic subject, i.e., the migration length of a photographic subject, is measured by the distance measurement means. By the drive control means which operates based on this distance information, the sense of the mirror plane of a mirror is turned in the direction of a photographic subject.

[0026] Thus, by a mirror being turned in the direction of a photographic subject according to a motion of a photographic subject, even when a photographic subject carries out the above migration, its face can be seen. [who is reflected to a mirror]

[0027] As for an image pick-up device according to claim 4, let a mirror be a convex mirror.

[0028] Since the angle of view (range which copies a photographic subject) is larger than the plane mirror of the same magnitude, a convex mirror can miniaturize a mirror compared with the same magnitude or the plane mirror which can copy the photographic subject of the range.

[0029] It has the image pick-up device for an image display device according to claim 5 to picturize the image displayed on a screen, and the image pick-up device is arranged in the screen of an image display device.

[0030] For this reason, its face is mostly picturized from a transverse plane by the image pick-up device arranged in a screen. [who looks at a screen] Therefore, though it is a look [having seen the screen] or a posture, its natural image is picturized. [in the condition of having turned to the transverse plane] When a photographic subject is located in the transverse plane of a screen, field angle doubling stops furthermore, needing.

[0031]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing.

(Gestalt of the 1st operation) The PC camera 10 concerning the gestalt of operation of the 1st of this invention is shown in drawing 1 and drawing 2 . The PC camera 10 of an approximate circle prism is supported by **** 12 rotatable in the direction of four directions by predetermined within the limits, and

this **** 12 is attached in up 14A of a display 14. a fitting location -- the Screen 16 side of a display 14 -- ***** of a display 16 -- it considers as a center mostly.

[0032] Ahead [of a display 14] the person 18 using the TV conference system 26 concerning the gestalt of this operation is located, and the PC camera 10 is turned in the direction of the person 18.

[0033] Moreover, the rectangular plane mirror 20 is formed in the lens 10A upper part of the PC camera 10. The plane mirror 20 is set by the field M (anchoring side of lens 10A) where the optical axis L of lens 10A and a longitudinal direction cross at right angles in parallel, and it is presupposed by supporter 20B prepared in the lower limit that it is rotatable forward and backward (the direction of drawing Nakaya mark A).

[0034] Mirror plane 20A of a plane mirror 20 inclines in the person 18 direction a little to Field M here. the look I when theta 1 looks at the center of a mirror 20 whenever [tilt-angle] from eye 18A of the person 18 (photographic subject) mostly located on an optical axis L, the angle theta 2 formed with the optical axis L, and abbreviation -- it is set up identically.

[0035] theta 2 or theta 1 is calculated by count with the distance L1 from the lens 10A core on an optical axis L to eye 18A, and the spacing N of a lens 10A core and the center section of the plane mirror 20 ($\theta_2 = \tan^{-1} N/L_1$).

[0036] spacing of $N = 8\text{cm}$, and eye measurement -- distance L -- when referred to as $l = \text{about } 80\text{cm}$, what is necessary will be for theta 2 to become about 5.7 degrees and just to set it as $\theta_1 = 5.7$ degree. Incidentally, when distance L1 is set to about 50cm and about 100cm, theta 2 becomes about 9.1 degrees and about 4.6 degrees.

[0037] Although various these setting approaches of theta 1 are considered, in order to realize with easy structure, the method of forming a graduation for which supporter 20B of a plane mirror 20 understands a rotation include angle with the PC camera 10 is suitable. Moreover, it is also possible to prepare an angle sensor etc. in this supporting section, to display the include angle of the detected plane mirror 20 on a screen, and to set it up.

[0038] It connects with the body 22 of a personal computer, and the PC camera 10 with which such a plane mirror 20 was formed is the configuration that the picturized image data can be transmitted to the body 22 of a personal computer. Furthermore the above-mentioned display 14, the keyboard 24, the mouse that is not illustrated, the microphone, the loudspeaker, etc. are connected to the body 22 of a personal computer, and it connects also with the network for holding TV meeting.

[0039] A person's 18 image 16A picturized with the PC camera 10 and image 16B of a communications partner are displayed on Screen 16 by this, and TV meeting is held through those images and voice. In addition, in the TV conference system 26 concerning the gestalt of this operation, image 16A and image 16B are changeable into the location of arbitration, and magnitude (however, the aspect ratio of an image is fixed) in Screen 16.

[0040] Thus, a plane mirror 20 is formed in the PC camera 10, and by theta 1 being set as the almost same include angle as theta 2 whenever [tilt-angle / of mirror plane 20A], from the person 18 to whom eye 18A is located in an optical axis L and the point with Look I of having crossed, an eye is located at the core of image 16A picturized with the PC camera 10, and a plane mirror 20, and it comes to be visible.

[0041] By this, its face comes to be located in the center of image 16A picturized by changing the sense of the PC camera 10, and location gap of the photographic subject image in the image 16 to the photographic subject image of a plane mirror 20 decreases so that its face may be reflected in the center of a plane mirror 20, and field angle doubling becomes exact.

[0042] Moreover, since it becomes easy actuation of the useless actuation by migration of a look decreasing, and doubling one's face in the center of a plane mirror 20 since what is necessary is to see only a plane mirror 20 and just to operate the PC camera 10 if it is not necessary to see image 16A of Screen 16 and puts in another way at this time, field angle doubling of the PC camera 10 becomes easy.

[0043] Furthermore, since a person's 18 face is reflected to the plane mirror 20 with which the person 18 turned the face to the PC camera 10, and was prepared in slack and the PC camera 10 to show a partner one's expression (image which turned to the transverse plane), its own image which a partner looks at

can be checked only by migration of few looks of seeing the face copied by the plane mirror 20.

[natural]

[0044] (Gestalt of the 2nd operation) Next, the gestalt of operation of the 2nd of this invention is explained. With the gestalt of this 2nd operation, since it is almost the same as that of the configuration explained with the gestalt of implementation of the above 1st, the same agreement is attached about the same component part, and explanation of that configuration is omitted.

[0045] The description of the gestalt of this 2nd operation uses for and explains a block diagram to ** and the Lord about the rotation approach of a plane mirror formed in PC camera.

[0046] The block diagram of the PC camera 30 concerning the gestalt of operation of the 2nd of this invention is shown in drawing 3. The focusing sensor 32 which the PC camera 30 is made into an automatic-focusing (AF) type, is made to emit for it light and receive infrared light, and measures distance with a photographic subject is formed in the interior. This focusing sensor 32 is connected to CPU34, and data processing of the distance information on the measured photographic subject is carried out by CPU34.

[0047] Moreover, the drive circuit 36 to which the distance information by which data processing was carried out is sent is connected to CPU34, and the drive 38 which makes lens 10A drive, and the rotation device 40 in which a plane mirror 20 is rotated are respectively connected to this drive circuit 36. The rotation device 40 consists of a small motor or a gear group (all are illustration abbreviations), and is prepared in supporter 20B of a plane mirror 20.

[0048] On the other hand, the image pickup device 42 is formed in the focus side of lens 10A, and the image pick-up device driver 46 and the timing generating circuit 44 as a drive control section are connected to the image pickup device 42 in order. Furthermore from the image pickup device 42, the analog signal processing circuit 48, A/D converter 50, the digital digital disposal circuit 52, and PC interface section 54 as the signal-processing section are connected in order.

[0049] Thereby, it is changed into a picture signal by the image pickup device 42 by which a person's 18 reflected light carries out incidence through lens 10A, and drive control is carried out by the timing and the image pick-up device driver 46 from the timing generating circuit 44 at the time of an image pick-up of the person 18 who becomes a photographic subject.

[0050] After signal processing of this picture signal is carried out in the analog signal processing circuit 48, it is changed into a digital signal by A/D converter 50, and signal processing is again carried out by the digital digital disposal circuit 52, and it is transmitted to the body 22 of a personal computer as image data from PC interface section 54. Moreover, from PC interface section 54, an actuating signal, drive power, etc. of each circuit section sent from the body 22 of a personal computer by the transmission route other than the transmission route of image data are supplied to each circuit section (the drive circuit 36, the timing generating circuit 44, the analog signal processing circuit 48, A/D converter 50, the digital digital disposal circuit 52, PC interface section 54) connected.

[0051] In addition, PC interface section 54 here can be considered as the various communication link interfaces using light and wireless, such as IrDA, in connecting with the serial or parallel port of the body 22 of a personal computer, or USB ****.

[0052] In moreover, the case so that it may move forward and backward somewhat with the condition that the field angle of the PC camera 30 does not shift from near the center of image 16A where a person 18 changes a posture and is picturized after doubling with a person 18 (on the optical axis L of lens 10A) By the focusing sensor 32, the distance of the PC camera 30 and a person 18, i.e., a person's 18 migration length, is measured, and data processing of the distance information is carried out by CPU34, and it is sent to the drive circuit 36.

[0053] From the drive circuit 36, a signal is sent to a drive 38 and the focal distance of lens 10A is set up the optimal according to distance with a person 18. Furthermore, the signal which carries out drive control of the rotation device 40 is sent also to the rotation device 40, and, thereby, the sense of mirror plane 20A of a plane mirror 20 is turned in the direction of a person 18.

[0054] Thus, by a plane mirror 20 being turned in the direction of a person 18 according to a motion of a person 18, even when a person 18 does the above migration, its face can be seen. [who is reflected to a

plane mirror 20]

[0055] Although considered as the configuration which uses a focusing sensor for automatic focusing here, it is also possible to acquire the distance information on a photographic subject from the output of an image pickup device 42, to double a focus or to rotate a plane mirror 20. In this case, a focusing sensor is made into an unnecessary and easy configuration.

[0056] In addition, the gestalt of the 1st operation is attained to, and with PC camera concerning the gestalt of this operation, a mirror is used as a rectangular plane mirror and formed in the lens upper part of PC camera by each. However, the configuration of a mirror, a class, and a fitting location are not limited to these.

[0057] The appearance of a mirror can also be made into a round shape or an ellipse form in addition to a rectangle. It is also possible to rotate a mirror so that a mirror may close a lens when not using (suppose that the abbreviation same size is circular with the gestalt of the 1st and this operation since PC camera is an approximate circle prism), and PC camera by doubling especially the configuration with the configuration of PC camera or a lens, and to use as a lens cover.

[0058] Moreover, the class of mirror can also be used as a convex mirror in addition to a plane mirror. In this case, a mirror can be miniaturized compared with the same magnitude or the plane mirror which can copy the photographic subject of the range.

[0059] Furthermore, the fitting location of a mirror can also be made into the lens side in addition to the lens upper part. Even when it prepares such, the effectiveness same at the time of field angle doubling is acquired by making a mirror incline in the direction of a photographic subject as mentioned above.

[0060] The gestalt of the 1st operation was attained to and the rotation actuation for carrying out field angle doubling with PC camera concerning the gestalt of this operation explained further again as what is depended on the method moved by hand. However, it is also possible to use this invention for the thing of a method which operates the rotation device prepared in PC camera with remote control.

(Gestalt of the 3rd operation) Next, the gestalt of operation of the 3rd of this invention is explained. With the gestalt of this 3rd operation, since it is almost the same as that of the configuration explained with the gestalt of said 1st operation, the same agreement is attached about the same component part, and explanation of that configuration is omitted.

[0061] that description is related with arrangement of PC camera about the display whose gestalt of this 3rd operation was equipped with PC camera -- it comes out.

[0062] The display 14 which formed the PC camera 50 concerning the gestalt of operation of the 3rd of this invention in drawing 4 and drawing 5 is shown.

[0063] The PC camera 50 of an approximate circle prism is being fixed at the tip of arm section 52A of the camera base 52 which carried out the abbreviation L type. Moreover, the camera base 52 turns arm section 52A caudad, and anchoring section 52B is attached in up 14A of a display 14. a fitting location - the Screen 16 side of a display 14 -- ***** of a display 16 -- it considers as a center mostly.

Therefore, the PC camera 50 is arranged at the predetermined height by the die length of arm section 52A in the center of the cross direction of the inside 16 of Screen 16 of a display 14, i.e., a screen, and can picturize the front of a display 14.

[0064] Moreover, in Screen 16 of a display 14, a person's 18 image 16A and image 16B of a communications partner are displayed not to lap with arm section 52A on the neighbors of the PC camera 50.

[0065] Thereby, its face is mostly picturized from a transverse plane with the PC camera 50. [in case a person 18 looks at Screen 16] Therefore, though it is a look [having seen Screen 16] or a posture, its natural image 16A is picturized. [in the condition of having turned to the transverse plane] When the person 18 who becomes a photographic subject is located in the transverse plane of Screen 16, field angle doubling of the PC camera 50 stops furthermore, needing.

[0066] Here, when using a personal computer for applications other than TV meeting (i.e., when not using PC camera), it is possible that the display of Screen 16 becomes hard to see with the PC camera 50 arranged in a screen, or the camera base 52 used for anchoring.

[0067] Then, it attaches with arm section 52A, and can respond by establishing the movable device of

versatility [**** / making the connection section with section 52B into an attachment-and-detachment type / section / connection]. For example, it is good also as structure which prepares rotation section 52C as shown in drawing 6 , enables it to move arm section 52A to a display top-face position, or prepares sliding-mechanism 52D as shown in drawing 7 , attaches arm section 52A, and can be stored in section 52B.

[0068] In addition, on the display concerning the gestalt of this operation, PC camera was fixed to the camera base of an abbreviation L type, and it considered as the configuration by which PC camera is arranged in a screen by the camera base being attached in a display top face. However, the configuration method or location into the screen of PC camera are not limited to this.

[0069] It is also possible to prepare a flexible device in the arm section of a camera base, to make PC camera slide in the vertical direction, to make it an image become legible or to attach a camera base in the side face and base of a display.

[0070] Furthermore, if a scope is glass [like a CRT mold], it is also possible to prepare the member of the shape of a sucker formed in the tooth back of PC camera with elastic bodies, such as rubber, to make PC camera stick to the location of the arbitration of a screen by the member, and to attach.

[0071] The display concerning the gestalt of this operation was considered as the CRT mold display of the simple substance used for the personal computer of a tower configuration (or desktop mold) further again. However, the class of display is not limited to this. It is also possible to arrange PC camera similarly on the liquid crystal mold display of a simple substance or the display of a book type personal computer.

[0072] If it is the book type personal computer 60 with which PC Card slot 66 was formed in up 62A of the display 62 as shown in drawing 8 here, anchoring section 52E of a PC card mold can be prepared in the camera base 52, and the PC camera 50 can also be arranged in Screen 64 by inserting the anchoring section 52E in PC Card slot 66. In this case, connection of the PC camera 50 and a book type personal computer 60 becomes easy by cable loess.

[0073]

[Effect of the Invention] when field angle doubling when picturizing one in case TV meeting etc. is held with a personal computer, since the image pick-up device and image display device of this invention were considered as the above-mentioned configuration talks by becoming easy -- a condition with the natural image of a photographic subject -- it can picturize -- and the image pick-up condition at that time -- a photographic subject -- it can check also to him. [who becomes a photographic subject]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the image pick-up device with which the personal computer which holds TV meeting etc. was equipped and which picturizes the image transmitted to a communications partner, and the image display device which displays the image.

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PRIOR ART

[Description of the Prior Art] Generally to the various networks formed with cable circuits, such as the telephone line, LAN or a communication satellite, etc., a personal computer In TV conference system which it is made to connect possible [a communication link / (call / only / hereafter / a "personal computer)"], and those which are in the distant location do [voice / a mutual image and voice] data communication, and holds conversation and a meeting The method of forming PC camera (image pick-up device) for picturizing one's image in the upper part of a display (image display device) is learned. [who transmits to a communications partner]

[0003] Moreover, as other methods of attaching PC camera in a personal computer, the approach (JP,9-128091,A) of attaching in the display upper limit of a book type personal computer, the method (JP,8-130702,A) of transmitting the image data which inserted in the PC Card slot of a personal computer the body part of PC camera used as the PC card mold, attached it, and picturized it to a personal computer side, etc. are proposed.

[0004] PC camera attached in the display upper part of the personal computer used for the above TV conference systems is shown in drawing 9 and drawing 10.

[0005] The PC camera 100 is located in screen 108 outside of a display 106, and is installed in the upper part of a display 106. This PC camera 100 is supported rotatable in the direction of four directions by predetermined within the limits at the stand 102 top, and is structure fixable towards the direction of arbitration. Here, the PC camera 100 is turned to the person 114 located ahead of a display 106.

[0006] In addition, rotation actuation of the PC camera 100 has the method moved by hand, the method which operates the rotation device (illustration abbreviation) prepared in the PC camera 100 with remote control.

[0007] Moreover, it connects with the body 104 of a personal computer to which the display 106 was connected, and the PC camera 100 is the configuration which can display the picturized image on Screen 108 of a display 106 through the body 104 of a personal computer. It connects also with the still more above communication lines (network), and this body 104 of a personal computer is in the condition in which data communication is possible.

[0008] By such system, the person 114 located ahead of a display 106 with the PC camera 100 is picturized, and the image 110 is displayed on Screen 108 of a display 106. Therefore, a person 114 can check his own image pick-up condition by seeing this image 110.

[0009] Here, if it is in the condition that the circuit was connected with the communications partner using the same system, since a partner's image 112 which is picturized similarly and transmitted via a circuit will be displayed on Screen 108, it becomes possible also for the figure of a communications partner to check a person 114 to coincidence. Moreover, such both (itself and partner) image is copied out also like the display by the side of a communications partner.

[0010] Furthermore, audio transmission is also possible with an image by using the microphone connected to the personal computer (or built-in), and a loudspeaker (all being illustration abbreviations). With TV conference system using such a personal computer, both who communicate can hold conversation and a meeting to both sides through a partner's image and voice which are mostly

transmitted to real time.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] when field angle doubling when picturizing one in case TV meeting etc. is held with a personal computer, since the image pick-up device and image display device of this invention were considered as the above-mentioned configuration talks by becoming easy -- a condition with the natural image of a photographic subject -- it can picturize -- and the image pick-up condition at that time -- a photographic subject -- it can check also to him. [who becomes a photographic subject]

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, since PC camera separated with the image display location in a screen and was arranged with PC camera of the above-mentioned configuration, field angle doubling for picturizing one in the suitable location in an image was not easy. [who becomes a photographic subject]

[0012] That is, since a big aperture (angular difference) is between the looks I2 when seeing a look I1 and the PC camera 100 in case a person 114 looks at an image 110 like drawing 10, vertical movement of the eye when seeing them by turns or a face is also naturally greatly forced ** and troublesome actuation.

[0013] Furthermore, when viewing by oneself the image 110 with which he was picturized, though natural, right and left look opposite. That is, if the PC camera 100 is rotated rightward temporarily, a photographic subject (person 114) image will move leftward [opposite] within an image 110. Therefore, it will move in the direction contrary to the direction to which a photographic subject image wants to move the PC camera 100 in the case of field angle doubling of a longitudinal direction, and it had the field where the actuation direction is unclear.

[0014] On the other hand, since it is carried out at the time of TV meeting, looking at a partner's image usually displayed on a screen, both become the image the face by the image pick-up from the slanting upper part turned [image] to the bottom for a while. The conversation which addresses toward the partner of such an image is very unnatural compared with an ordinary conversation which looks at and discusses a partner's face.

[0015] Here, although their eye and face can also be turned to the PC camera 100 since natural (the transverse plane was turned to) themselves is shown to a partner, Screen 108 cannot be seen at this time. Therefore, it becomes impossible to check the expression shown to its location and partner of a face within an image 110.

[0016] when talking by field angle doubling when picturizing ones in case TV meeting etc. is held with a personal computer in consideration of the above-mentioned fact being easy for this invention -- a condition with the natural image of a photographic subject -- it can picturize -- and the image pick-up condition at that time -- a photographic subject -- let it be a technical problem to offer the image pick-up device and image display device which can be checked also to him. [who becomes a photographic subject]

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective view showing the image pick-up device concerning the gestalt of operation of the 1st of this invention.

[Drawing 2] It is the side elevation showing the image pick-up device concerning the gestalt of operation of the 1st of this invention.

[Drawing 3] It is the block diagram of the image pick-up device concerning the gestalt of operation of the 2nd of this invention.

[Drawing 4] It is the perspective view showing the image display device concerning the gestalt of operation of the 3rd of this invention.

[Drawing 5] It is the side elevation showing the image display device concerning the gestalt of operation of the 3rd of this invention.

[Drawing 6] It is the expansion perspective view showing the movable device of an image pick-up device prepared in the image display device concerning the gestalt of operation of the 3rd of this invention.

[Drawing 7] It is the expansion perspective view showing the movable device of an image pick-up device prepared in the image display device concerning the gestalt of operation of the 3rd of this invention.

[Drawing 8] It is the perspective view showing the modification of the image display device concerning the gestalt of operation of the 3rd of this invention.

[Drawing 9] It is the perspective view showing a conventional image pick-up device and a conventional image display device.

[Drawing 10] It is the side elevation showing a conventional image pick-up device and a conventional image display device.

[Description of Notations]

10 PC Camera (Image Pick-up Device)

10A Lens

14 Display (Image Display Device)

16 Screen

16A Image

18 Person (Photographic Subject)

18A Eye

20 Plane Mirror

20A Mirror plane

30 PC Camera (Image Pick-up Device)

32 Focusing Sensor (Distance Measurement Means)

34 CPU (Drive Control Means)

36 Drive Circuit (Drive Control Means)

40 Rotation Device (Drive Control Means)

42 Image Pickup Device (Distance Measurement Means)

50 PC Camera (Image Pick-up Device)

62 Display (Image Display Device)

64 Screen

I Look

L Optical axis

M Field (field which intersects perpendicularly with the optical axis of a lens)

[Translation done.]

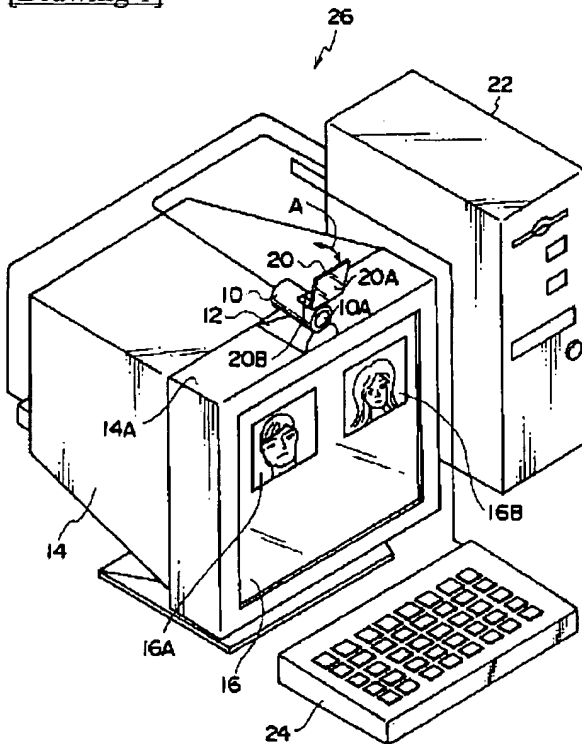
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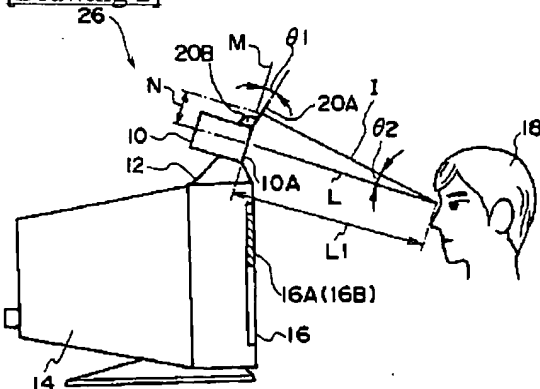
DRAWINGS

[Drawing 1]

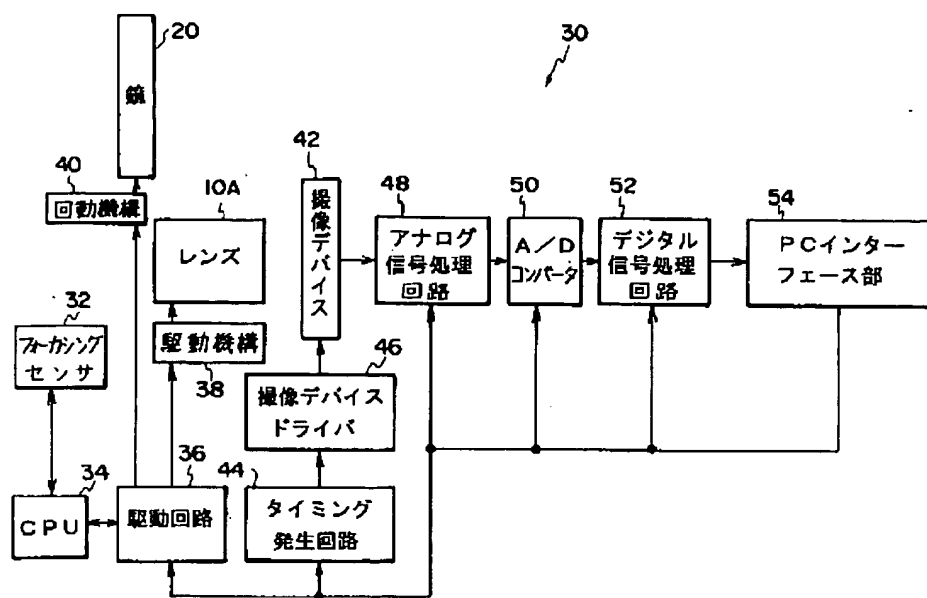


10 : P.C. Camera
20 : plane num

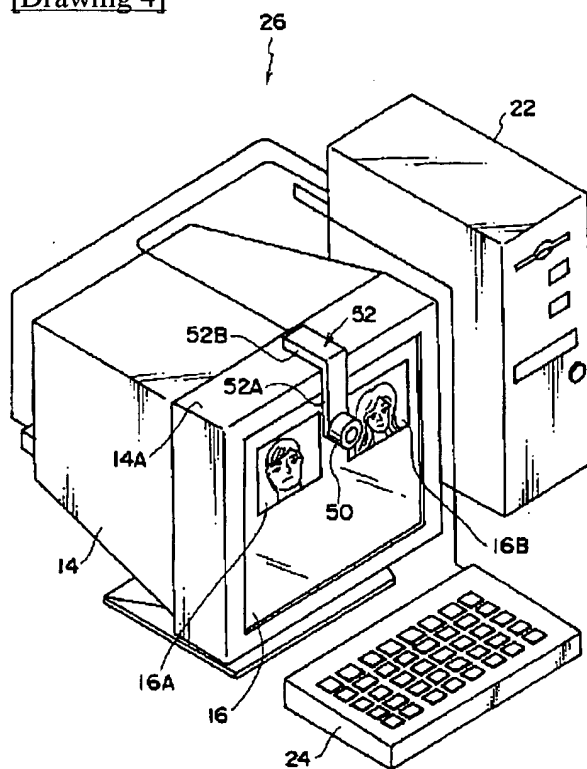
[Drawing 2]



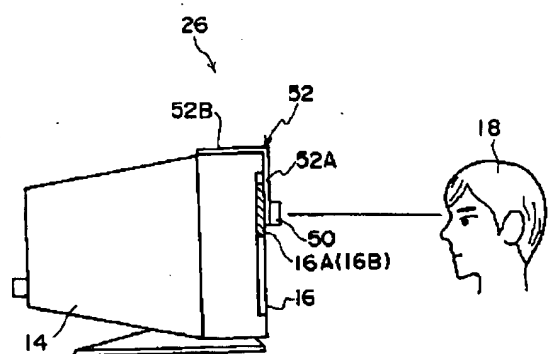
[Drawing 3]



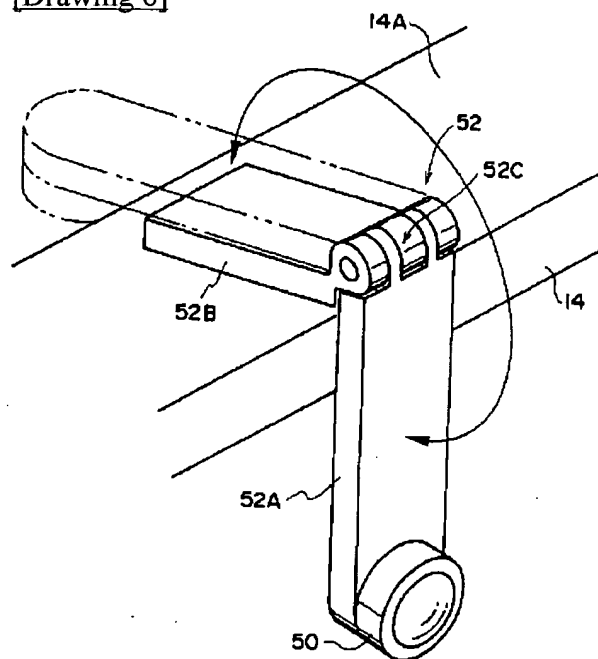
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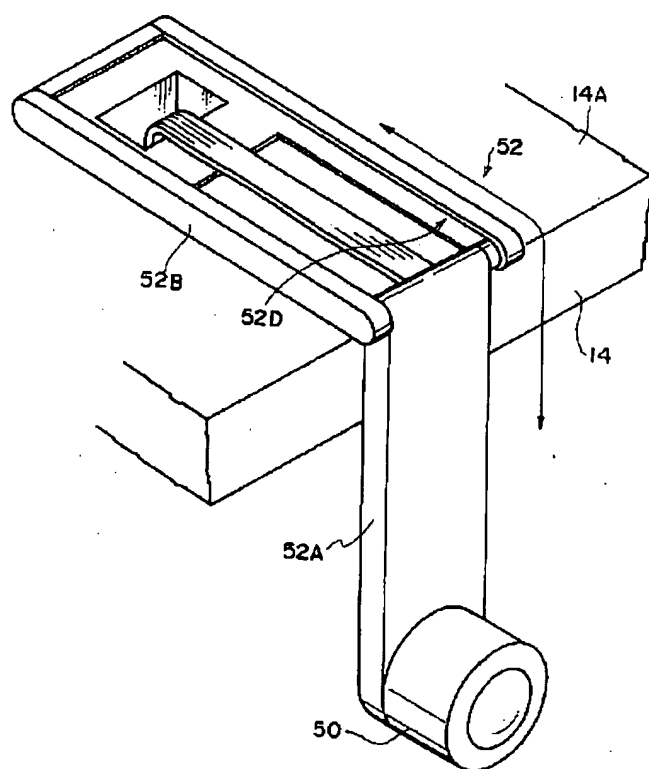
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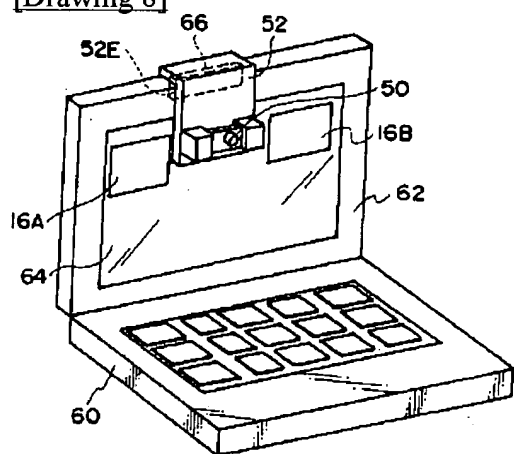
[Drawing 6]



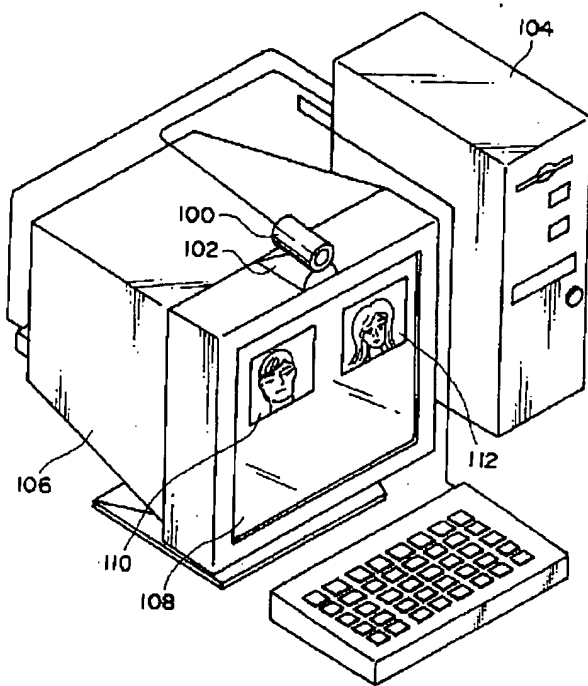
[Drawing 7]



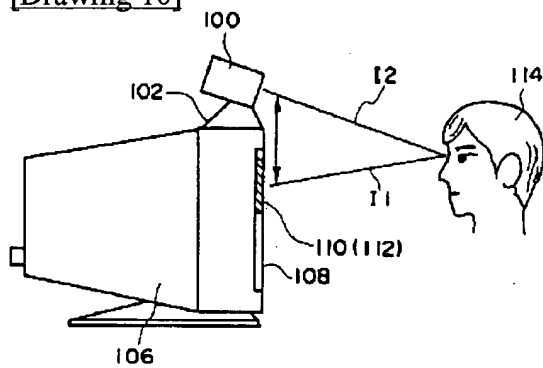
[Drawing 8]



[Drawing 9]



[Drawing 10]



[Translation done.]